This EIA was highly specific for detection of Chlamydial antigen in these specimens. Unlike other Chlamydial EIAs,[6-9] cross-reactivity with LPS antigenic determinants that are common to Chlamydiae and other gram-negative organisms was not a problem with this immunoassay. Negative test results were obtained in our laboratory with isolates of *Salmonella* spp., *Escbericbia coli,* and several preparations of LPS, all of which were known to cross-react with other chlamydial EIA tests.[7,8]

Except for the distraction of an occasional slowly draining test well, this EIA was simple to perform. The colored end point was visually sharp, and generally there was increasing color development with increasing levels of Chlamydial antigen. The EIA used in this study required 21 minutes to complete; however, this time has been reduced to 9 minutes for the test currently available.

Overall, this EIA was highly specific and relatively sensitive for detection of Chlamydial antigen in ovine placentas and fetal tissues. Its slightly reduced sensitivity in comparison with isolation in cell culture must be weighed against its advantages: speed, cost, and less stringent requirements for handling and transport of samples. This solid-phase EIA is useful for the routine diagnosis of Chlamydial infections associated with ovine abortions.

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Sources and manufacturers

a. Kodak SureCell™ Chlamydia Test Kit, Eastman Kodak Co., Clinical Products Division, Rochester, NY.

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Summary of bacterial isolates from farm-reared channel catfish (1979-1988)

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The channel catfish *(Ictalurus punctatus)* is the principal commercial farm-reared fish in the southeastern United States. There are > 94,000 acres of earthen ponds devoted to catfish aquaculture in the Mississippi River delta.[1] Because catfish are raised under intense management conditions (i.e., high stocking rates of 8,000-12,000 fish/acre), epizootics can be devastating. In 1988, catfish producers in the United States lost over $6 million in revenues (e.g., decreased production and increased production costs) because of infectious diseases.[2] As the aquaculture industry continues to grow and expand, aquatic farmers will seek assistance from various diagnostic facilities concerning diagnosis and management of disease conditions in their livestock.

In Mississippi, fish health diagnostic laboratories are located in the Delta (Stoneville and Belzoni) and at the Mississippi State University campus (Starkville). Catfish producers may submit cases to these laboratories either directly or through their county Extension Service agent. Procedures for submission of specimens for diagnostic workup are similar to those for other diagnostic laboratories. Affected fish (live and dead), as well as water and occasionally feed samples, are submitted for evaluation.

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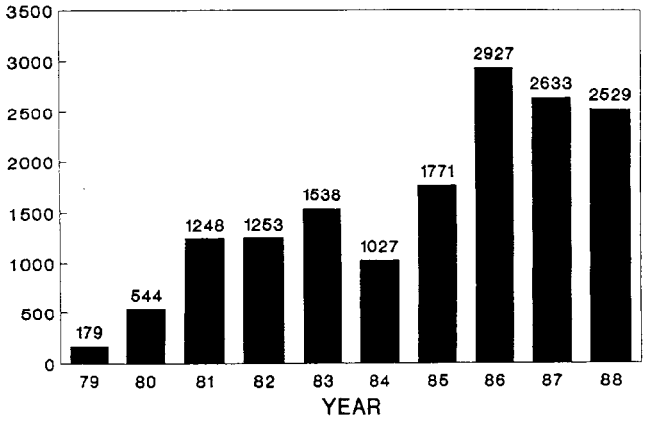

Figure 1. Number of fish-kill cases submitted annually to Mississippi Cooperative Extension Service Fish Diagnostic Laboratories (1979-1988).

The purpose of this report is to summarize the bacterial isolates from cases submitted to the Mississippi Cooperative Extension Service Diagnostic Laboratories from 1979 to 1988 and to briefly discuss pertinent findings.

The fish kill investigation form[3] serves as the case record of each submission. A case is considered the sample of fish submitted from a single production unit or pond. Pond history, number and size of fish affected, previous treatments, water quality, and nutritional status are generally identified prior to necropsy examination. Fish are necropsied, and appropriate samples are collected for further laboratory examination (e.g., bacteriology, virology, or histopathology). These historical data and necropsy and laboratory results are recorded in the fish kill investigation data base, which includes the records from 15,649 cases submitted from 1979 to 1988. The number of cases submitted annually increased dramatically from 179 cases in 1979 to a maximum of 2,927 cases in 1986 (Fig. 1). However, the number of cases submitted has remained fairly constant from 1986 to 1988 (mean = 2,696 cases/year). This data base was reviewed and bacterial isolates were summarized.

Table 1 summarizes the bacterial isolations from cases submitted from 1979 through 1988. Since 1979, bacteria have been isolated from 9,372 (59.9%) of 15,649 cases. More than 1 bacterial species were isolated from many cases, and occasionally multiple bacteria were identified.

The number of isolations of *Edwardsiella ictaluri* has increased dramatically since it was first recognized at this laboratory in 1980. It was the most commonly identified bacterial pathogen of farm-reared catfish in the data base and was isolated from 5,618 (59.9%) of the 9,372 cases from which bacteria were isolated. On an annual basis, *E. ictaluri* accounted for a minimum of 18.3% of bacterial isolates in 1980 and up to 72.6% of bacterial isolates in 1986.

Columnaris disease is caused by internal, external, or combination infections by *Cytophaga (Flexibacter) columnaris.* For this presentation, the various forms have been combined. However, the external or dermal form generally accounted for about two-thirds of the cases of columnaris disease. Between 1979 and 1988, *Cytophaga* spp. were identified in 4,408 (47%) of 9,372 cases resulting in bacterial isolation and annually accounted for from 33.3% (1979) to 40.6% (1987) of total cases.

Over this lo-year period, aeromonads (including A. *hydrophila, A. sobria,* and *Aeromonas* spp.) accounted for 26.5% of bacterial isolates. The annual isolation rate of *Aeromonas* decreased from 44.4% in 1979 to a minimum of 25.4% in 1988. The number of cases from which *Aeromonas* was isolated remained fairly constant during the study period. However, the annual percentage of *Aeromonas* isolations has decreased because of the marked increase in *E. ictaluri* isolations. Prior to 1983, *Aeromonas* and *Cytophaga* were the most common isolates. Other bacteria that were less frequently recovered are common water-borne gram-negative bacilli, including pseudomonads, *Plesiomonas, Proteus, Enterobacter,* and *Klebsiella.*

From 1979 through 1988, there was a marked increase in

Table 1. Summary of bacteria isolated from channel catfish at The Mississippi Cooperative Extension Survey Diagnostic Laboratories (1979-1988).

Bacteria	Year									
	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Aeromonas hydrophila	25	113	32	38	48	34	42	55	104	80
A. sobria	0	0	2	98	211	126	171	327	340	356
Aeromonas spp.	0	0	188	90	4	7	2	0	1	6
Plesiomonas	0	2	5	11	8	2	6	23	16	17
Edwardsiella tarda	0	3	10	7	5	2	12	9	8	14
E. ictaluri	0	43	100	179	402	317	879	1,359	1,184	1,169
Cytophaga columnaris	22	144	452	353	550	372	673	1,124	1,235	858
other *Myxobacteria*	2	3	26	11	6	9	10	7	14	154
Pseudomonas fluorescens	1	5	1	0	1	1	4	1	2	1
Pseudomonas spp.	0	2	4	4	2	4	1	8	15	12
Klebsiella	1	0	1	1	0	0	0	1	1	8
Enterobacter	0	0	5	3	2	2	0	10	1	4
Proteus	0	0	1	0	0	0	0	1	1	0
Others	3	14	28	11	49	8	11	26	30	12
Unidentified	10	16	43	7	1	0	0	0	1	0

the number of new water acres used for catfish production in the delta region of west-central Mississippi.[2] This increase in production was reflected by the establishment of the fish health diagnostic laboratory at Belzoni in June 1986 and the subsequent increase in the aquatic diagnostic case load of the Mississippi Cooperative Extension Service. The fish health diagnostic laboratory case load has remained relatively constant since 1986, which may reflect a decreasing growth rate of this industry in Mississippi or failure of producers to seek diagnostic laboratory support. However, the industry continues to expand within Mississippi and in adjoining states and other areas of the country.

Bacterial diseases continue to be a major economic factor for commercial catfish farmers. Motile *Aeromonas* septicemia, columnar-is disease *(Cytophaga* spp.), and enteric septicemia of catfish *(E. ictaluri)* were the most prevalent bacterial diseases identified. During epizootics, early and accurate disease diagnosis is critical to catfish producers to minimize losses. Affected fish frequently eat less and thus have limited exposure to antimicrobials. Therapeutic administration of antibiotics is expensive and too frequently is not cost effective. Therefore, prevention of diseases by minimizing stress and exposure to pathogens is the best management strategy.

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Porcine *Streptococcus suis* in Minnesota

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Streptococcus suis infection in swine is a disease of worldwide importance to the swine industry[8] and has been associated with a variety of disease processes including meningitis, bronchopneumonia, arthritis, endocarditis, polyserositis, rhinitis, and abortion.[7] *Streptococcus suis* has also been isolated from cases of meningitis in humans,[1,2] so it must be considered a Zoonotic agent.

Although more than 30 serotypes of S. suis have been described, the relative importance of the different capsular types is unknown and may vary with time and geographic area.[3] *Streptococcus suis* infections in most countries are associated with capsular type 2, but in Denmark and Finland capsular type 7 is the most prevalent? The objective of the present study was to study the prevalence of the capsular types of S. *suis* and to analyze some characteristics such as weight of animals affected and signs and histopathologic lesions from samples submitted to the Minnesota Diagnostic Laboratory over a l-year period.

Porcine S. *suis* cases submitted to the Minnesota Veterinary Diagnostic Laboratory from July 1, 1989 to June 30, 1990 were studied. Depending upon the site of isolation and the major clinical signs, S. *suis* case accessions were placed in 1 of 4 categories: 1) polysystemic, 2) aborted fetuses, 3) brain/meninges, or 4) lungs. The serotype, clinical signs reported by the submitting veterinarian, weight of animals affected, the presence of intercurrent infectious agents, and the nature of histopathologic lesions were recorded.

The bacteria were identified using the Rapid-Strep system[a] for the identification of streptococci and were serotyped using a coagglutination technique previously described.[4] Antisera against serotypes 1/2 (which reacts with both serotypes 1 and 2 but is a different serotype) and 1-12 (most of the *S. suis* serotypes are within this group) were included in the study.

The greatest number of S. *suis* isolates were from respiratory cases (272 accessions). Pigs with S. *suis* respiratory infections had a wide distribution of weights (3-500 pounds, x = 91.65, SD = 75.48), but no pattern was found. The most common serotype of S. *suis* from respiratory infections was serotype 2 (27%), followed by a wide variety of serotypes including 3, 8, 4, 7, nontypable, 5, 11, 9, and 6. The most commonly reported clinical signs were sudden unexpected death, respiratory signs including coughing and dyspnea, poor growth, diarrhea, neurologic signs, weakness, and lethargy. In more than 89% of the respiratory case accessions, another infectious agent was isolated from lung. The most common intercurrent infectious agent was *Pasteurella multocida* (45%), followed by *Actinobacillus pleuropneumoniae* (21%), *Actinomyces pyogenes* (8.8%), *Salmonella choleraesuis* (8%), *Haemophilus parasuis* (7%), *Bordetella bronchiseptica* (6%),

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